

# Oct. 9 meteor event over dark New Mexico skies adds to understanding of atmospheric phenomena



EYE ON THE SKY — Dale Jackson (5737) checks out a Sentinel network all-sky video camera system prior to installation at Sandia’s LAZAP facility. A Sentinel system consists of a small, inexpensive black-and-white video camera equipped with a fisheye lens, with digitized video fed to a PC. Almost 100 Sentinel systems are deployed and monitored by volunteers in 11 states and five Canadian provinces. Sandia’s Sentinel camera and a unit in Lamy, N.M., recorded a significant meteor event in the early hours of Oct. 9. (Photo by Randy Montoya)

By Bill Murphy

You probably didn’t see it, but a couple of instruments in the Sandia-established Sentinel network did. What they saw — and you likely missed — was a marvelous nighttime light show.

In the early morning hours of Oct. 9 — at around 2 a.m. MDT — a meteor came streaking into the atmosphere over the western US. Its trail, an unusually bright and persistent slash across the dark sky, was picked up by at least two Sentinel skywatch systems, one at Sandia and one maintained by serious amateur astronomer Tom Ashcraft near Lamy, N.M.

The meteor, visually striking enough to generate local media interest, came out of the northwest sky and — according to early estimates by Sandia astrophysicist Dale Jackson (5737) — likely impacted somewhere in the rough country south and east of Glorieta, N.M. Dale says that as he and colleague Dick Spalding (5730) refine and analyze the data collected that night, they’ll get a better handle on the size and trajectory of the meteor and may even be able to pinpoint the impact location with some precision.

Using a Google Maps application written specifically for the purpose in the summer of 2008 by student intern Leandra Boucheron (1344 now; 5737 last year), Dale and Dick plotted the meteor’s flight path as seen from the Sandia instrument and from Tom Ashcraft’s instrument in Lamy. With those two frames of reference, they used the software to generate a Google Map overlay showing the initial estimate of the meteor track.

Dick is in the process of polling other members of  
*(Continued on page 5)*

## Walking through JBEI



The Joint BioEnergy Institute — JBEI — is one of DOE’s premier research centers focused on development of the next generation of biofuels. Thirty-two Sandians are among the JBEI research team. *Lab News* photographer Dino Vournas spent a day at JBEI. See his photos on **pages 6-7**.

## Sandia/New Mexico earns ISO 14001 certification



It’s the gold standard for environmental management practices and Sandia has attained it. This summer, the Labs earned the International Organization for Standardization (ISO) 14001 certification for its Environmental Management System (EMS). ISO 14001-certified organizations are recognized as providing a level of rigor and commitment to environmental protection. According to ISO 14001



*(Continued on page 4)*

# Sandia LabNews

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## Shining a new light — with hydrogen

**Boeing, Caltrans, other industry partners join with Sandia on new mobile lighting application**

By Mike Janes

What started out as a modest idea from Boeing to develop a fuel cell-powered mobile lighting system has attracted the attention of everyone from Hollywood to the California Department of Transportation (Caltrans). And Sandia is happily sitting square in the middle.

Mobile lighting refers to small, portable lighting systems used primarily by highway construction crews, airport maintenance personnel, and even film crews. Boeing, says Sandia project lead Lennie Klebanoff (8367), is embracing alternative energy options; the company approached him last year about getting fuel cell technology into airport ground support equipment, which includes lighting systems.

Traditionally, mobile lighting units are powered by diesel fuel generators that produce CO<sub>2</sub>, NO<sub>x</sub> (nitrogen oxides produced during combustion), and soot, making them less than ideal for the environment. In addition,

*(Continued on page 3)*



### Inside . . .

- Friends recall Roseann Martinez . . . . . 2
- Maintenance and Logistics succeed with BBS . . . . . 4
- Sandia wins award for NINE program . . . . . 5
- How H1N1 spreads — a one-page summary . . . . . 8
- Carlos Gutierrez, Thomas Paez win HENAAC awards . . . . 9
- A brave boy charms a roomful of engineers . . . . . 9
- Ethics in action: Misuse of JIT system . . . . . 10
- Rachel Kolb has the write stuff, and the ride stuff, too . . 12





# That's that

Came across this headline from a British newspaper the other day: “Energy crisis is postponed as new gas rescues the world: Engineers have performed their magic once again. The world is not going to run short of energy as soon as feared.” The gist of the story was that engineers have developed a way to dramatically increase the natural gas yield from existing wells. Now, I don't know anything about the merits of the claim and surely there are those who believe we need to burn less natural gas and not more.

But that's not what caught my eye. Nope. What I liked was the wording of the headline itself, the part that says “Engineers have worked their magic once again.” Two things are striking here, or actually, three things: First, that engineers have worked their *magic*; second that they've done it *again*; and third, that the headline writer knew readers would unquestioningly accept both assertions.

Sitting around their breakfast tables, tucking into their full English fry-ups, countless *Telegraph* readers all across Britain nodded in agreement with that headline the other morning, saying, “Yup, those crazy engineers have gone and done their magic again!”

In fact, we're surrounded in our lives by the magic that engineers have worked; virtually everything we touch in the modern world has been engineered in some way. To the nonengineers among us – and that means most of the planet's six-something billion people – Arthur C. Clarke's famous dictum holds true: “Any sufficiently advanced technology is indistinguishable from magic.” Don't believe me? Think about that GPS gadget in your car. For less than 100 bucks, you have this little device that tells you exactly where you are, and – even more incredibly – where the nearest pizza joint is. Even recognizing as I do the complexity of factors that make that device possible – the mastery of space flight; the evolution over the past 60 years of computers, software, and microelectronics; the conception and creation of the GPS constellation; advances in manufacturing, marketing, and distribution that make it possible to mass-produce and package the device and distribute it globally for a very accessible price – even with all that, my Garmin still strikes me as near-magical.

\* \* \*

This is getting to be a habit. Couple of issues back, I wrote about watching the rain outside my window. Now, I'm watching the birds. Seriously. Remember that photo we ran on Sept. 11 of the roadrunner mama feeding her baby? Well, for the past couple of days, I'd been watching a roadrunner dashing crazily back and forth along the fence line that runs just west of Bldgs. T14, T15, and T16. The roadrunner was on the wrong side of the chain link fence, basically trapped in the tech area. Now and then she'd try to fly up over the fence, but she couldn't make it – roadrunners are practically flightless, after all. Anyway, she – and we think it was a “she” – would dash along the fence, run to the corner closest to Bldg. 800, look frantically over at the lawn (where she was feeding her baby in that photo) and then dash back along the fence. She just kept doing this over and over for two days. We figured maybe somehow she'd gotten separated from her babies. It was really heart-wrenching to watch how desperate she was. All of us in the office sort of adopted her. Michelle Fleming called Jennifer Payne (4133), an Ecology Program biologist from the Environmental Programs and Assurance group, and told her what was going on. Jennifer came over right away and took charge. (The Ecology Program biologists are tasked with handling wildlife issues at Sandia.) In this case Jennifer placed a small amount of wet cat food – roadrunners like meat – on the other side of the fence next to a bird-sized opening under a gate. She then bit by bit coaxed the distressed bird toward the opening, where she smelled the meat incentive on the other side and quickly figured out how to escape.

When she cleared the fence, the roadrunner dashed for the bushes in front of Bldg. 800 and we haven't seen her since. Was she the bird from our Sept. 11 photo? Don't know, but I like to think so. Hope she found her babies.

See you next time.

– Bill Murphy (505-845-0845, MS0165, wtmurph@sandia.gov)

The Ecology Program is available to assist with wildlife issues, including snakes in or near work areas. They remind us that feeding wildlife at Sandia is not allowed at work. For more information, contact Stephanie Salinas at 845-7711. For wildlife-related issues in California, call the ES&H hotline at 294-3724.

## Employee death

# Roseann Martinez was a social nucleus with a heart of gold

Roseann Martinez, office administrative assistant in Dept. 6726, died Oct. 6 at age 36. She had been at Sandia seven years and began working in Dept. 6726 last July.

“When she set up her office area, it was immediately clear what was most important to her,” says her manager Nancy Jackson (6726). “Pictures of her two sons, Ben and Jesse, ages 8 and 9, surrounded her desk. Although Roseann struggled with health problems, she was always cheerful and willing to help. Even when she was in pain, she always tried to have a smile and a positive attitude.”

“Roseann was my OAA for about four years,” says Louis Weichman (2625). “She was the social nucleus of our department. She was a definite people person. She liked to help others and always took time to give them proper guidance. She enjoyed making travel arrangements. She continually requested feedback for personal improvement.

“Her boys were the highlight of her life. They were involved in baseball and football, and Roseann was involved right along with them. I believe she was even a coach one year.”

“My most fond memories of Roseann center around the Christmas parties,” says Marsha Leatherwood (2625). “She always made them fun and made sure everyone had a good time. She would come up with little games and presents that made it special.

“Roseann was extremely generous of her time and went out of her way to be helpful. She even helped people that weren't in her department. We all relied on her because she was so capable and cheerful. We all loved her.”

Adam Green (2626) says that Roseann excelled at team building. “About once a month she would invite everyone who had a free day to get together at an Isotopes game,” says Adam. The group that attended the games called itself the Lab Rats. Roseann was a big sports fan.

“She was a great person,” he says.

“When someone in the group was out ill, she made sure that everyone signed a get well card,” says Dorothy Meister (2626). “When I returned from an extended illness one year, she had talked the group into getting me a small starter garden kit. I love gardening. The kit included seeds, gloves, potting soil, and peat pots. I could start the garden on my kitchen table and by the time I was completely well, it would be time to transplant the little seedlings outdoors. I loved it, and had a nice start on my garden.”

“Roseann and I shared an extensive amount of time together at work and away from work,” says Elizabeth Schexnayder (0424). “I sort of adopted her as my sister. We had so much in common. We laughed and cried together. She had a heart of gold and loved her boys more than life itself.”

— Iris Aboytes



ROSEANN MARTINEZ

# Sandia LabNews

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LOCKHEED MARTIN

# DOE Worker Safety and Health Program workshops scheduled for Oct. 28-29

Sandia employees, contractors, and subcontractors have an opportunity on Oct. 28 and Oct. 29 to learn about Title 10 Code of Federal Regulations Part 851, “Worker Safety and Health Program.” The video workshop is sponsored by Sandia, DOE's Office of Health, Safety, and Security, and the NNSA Sandia Site Office.

At Sandia, the workshop will be held in Bldg. 823, Rm. 2279. Seating is limited; reservations are required.

A two-hour Worker Safety and Health Program training session, repeated twice each day (Oct. 28 and Oct. 29), will give interested individuals four opportunities to attend one of those sessions. The two-hour sessions are 8:30-10:30 a.m. and 11:30 a.m.-1:30 p.m. each day.

The balance of the workshop, from 1:30-3:30 p.m. each day, will address such topics as training assessment initiatives, standardization and reciprocity of training, training implementation approaches, and worker health and safety oversight and enforcement strategy. Persons interested in attending one of the awareness training sessions and/or the balance of the workshop should contact Dick Steele (4024) at 505-284-4353 or rsteele@sandia.gov.

Glenn Podonsky, DOE's chief Health, Safety, and Security officer, recently told DOE managers that “workshop activities will assist your organization in maintaining focus on your missions by clarifying 10

C.F.R. 851 training issues. The objectives of the workshop are to increase awareness of the 10 C.F.R. 851 Worker Safety and Health Rule for workers, managers, and health and safety professionals, as well as to exchange information on challenges and best practices for 10 C.F.R. 851 awareness training.”

The workshop is part of a larger collaborative effort responding to the need expressed by worker representatives to provide information about workers' rights and responsibilities and related training requirements to workers, DOE, and DOE contractor training professionals, safety and health professionals, and managers.

## Lab News reader service

The *Sandia Lab News* is distributed in-house to all Sandia employees and on-site contractors and mailed to all Sandia retirees. It is also mailed to individuals in industry, government, academia, non-profit organizations, media, and private life who request it.

**Retirees (only):** To notify of changes in address, contact Benefits Dept. 3332, Customer Service, at 505-844-4237, or Mail Stop 1021, Sandia National Laboratories, Albuquerque, NM 87185-1021.



# Mobile lighting

(Continued from page 1)

diesel units are noisy, which creates a safety hazard when construction personnel are distracted and can't hear oncoming traffic. A fuel cell running on pure hydrogen, on the other hand, is both very quiet and a zero-emission electric power source.

Lennie estimates that each deployed fuel cell-based mobile light would avoid the burning of nearly 900 gallons of diesel fuel per year and eliminate NO<sub>x</sub> and soot emissions. If the hydrogen used is generated from non-fossil fuel sources, then each mobile light unit would also reduce CO<sub>2</sub> emissions by about nine metric tons per year.

## Two separate designs

Sandia has adopted a two-pronged (alpha and beta) approach to the project. First, along with a number of external partners who are contributing time and in-kind resources, Lennie's team is overseeing the production of the alpha mobile lighting unit that is expected to debut at an upcoming meeting of the American Association of State Highway and Transportation Officials (AASHTO). The alpha unit, while separate from the more advanced beta design that Sandia recently completed for Boeing, came about due to the enthusiasm of several industry partners and their desire to see a system built sooner rather than later.

The alpha system consists of advanced power-saving Light Emitting Plasma™ technology (contributed by Luxim, Lumenworks, and Stray Light), two high-pressure hydrogen tanks (purchased by Sandia), a trailer to transport the equipment (provided by Multiquip), and a fuel cell (provided and installed by Altery Systems). Multiquip and Altery are assembling the overall unit, while Sandia has consulted on its design and formulated the alpha unit technical plan for the team.

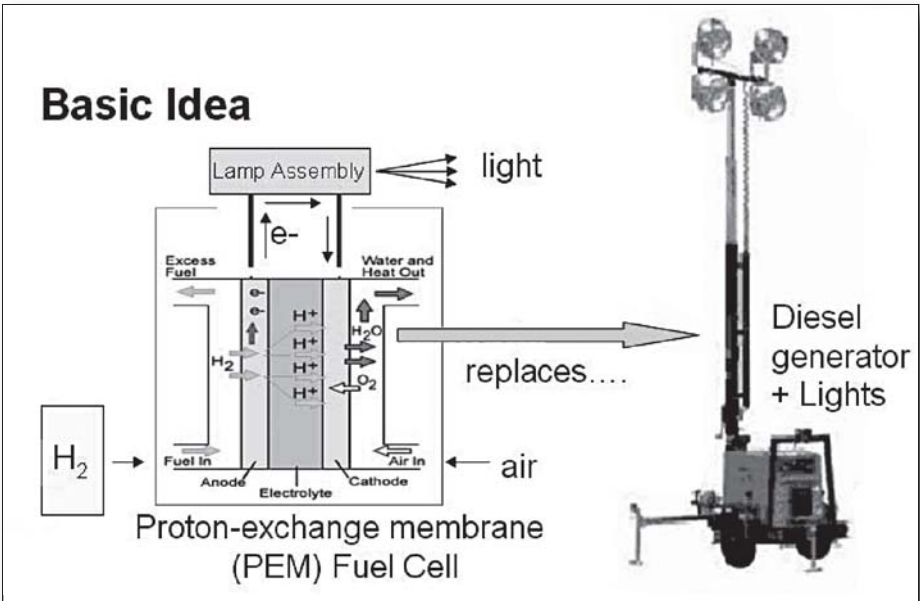
"The beauty of this project is that it ties together the manufacturers [Multiquip, Altery Systems,

significant development as Sandia/California has identified transportation energy as a key mission area and hopes to partner with Caltrans again in the future.

## Other partners fall into place

Sandia initially completed a project for Boeing that examined the use of fuel cells for aircraft emergency power, Lennie says. Boeing was happy enough with the work, he says, that he was then contacted by its Phantom Work division (the main R&D arm of the company). This time, Boeing asked if Sandia would be interested in exploring the viability and applicability of fuel cells for ground support equipment. That discussion quickly led to the idea of developing a fuel cell mobile light for aviation ground support.

The project broadened considerably when Lennie gave a talk at the California Hydrogen Business Council



tious unit that uses metal hydride storage tanks designed by Ovonic Hydrogen Solutions. These tanks store 12 kilograms of hydrogen, and thus offer some 90 hours of operating time (compared to the 30-40 hours offered by the alpha unit). Sandia's engineers designed the overall beta system and solved the thermal management issues that sur-

# Sandia California News

in Sacramento. That talk led to concrete interest from Golden State Energy and the California Fuel Cell Partnership (CAFCP). Golden State Energy has since been instrumental in making connections with a fuel cell supplier (Altery Systems) as well as a leading manufacturer of construction equipment (Multiquip Inc.), while CAFCP helped link Sandia with SFO, which would now like to deploy a unit.

After Lennie briefed Caltrans Director Randy Iwasaki on the idea, Iwasaki directed his Division of Research and Innovation (DRI) to get involved. Not surprisingly, Caltrans has proven to be an enthusiastic and highly engaged partner in the deployment of the Alpha unit, which will be field-tested in Caltrans maintenance projects near Los Angeles. "Caltrans and all the other project partners have been amazing," says Lennie.

In addition to Caltrans, Altery Systems, Luxim, Lumenworks, Stray Light, CAFCP, Golden State Energy, Boeing, and Multiquip, the project has attracted the interest of SFO, a longtime partner with Sandia on various homeland security projects. SFO would like to test the system for use in nighttime runway repair work, as well as in its terminal renovation activities. Unlike diesel systems, the fuel cell-powered mobile light can be used indoors.

## Boeing design to use metal hydride storage

"Caltrans wanted us to get the alpha version in front of their highway transportation peers immediately, and our unit will be in operation and actually illuminating the

new electric cars being featured at the AASHTO meeting," says Lennie. "It will give all of us good feedback on how interested potential customers are in the technology, and also allow us to get an initial assessment of how the technology performs, particularly the plasma lighting."

The plasma lights contributed by Luxim and Lumenworks, he says, use half the power of traditional LED lighting.

Boeing funded Sandia primarily to develop the beta design, a more sophisticated, technically ambi-

round metal hydride storage, including coupling waste fuel cell heat to the hydride bed.

Metal hydride storage is also appealing since it removes many of the safety concerns found with having high pressure on the alpha unit (whose tanks hold hydrogen at 5,000 psi, compared to 250 psi with the metal hydride tank system). These are all important considerations for commercialization, Lennie says.

The system's beta version, says Lennie, was designed by an engineering team led by Terry Johnson (8365) and Celia Song, a summer student from Cornell University, and George Sartor (8365). Sal Birtola (8350) and Ben Chao from Ovonic Hydrogen Solutions made important contributions to the system design, while management support from Jay Keller (8367) was also key to the project. Song presented the design to Boeing in mid-August.

Lennie says other funding sources are being sought so that the beta system can be built and both versions of the system can then be tested and compared on equal terms. The team would also like to use the field-test data to perform quantitative analyses of the emissions reductions and increased energy efficiency afforded by the technology. Ultimately, he says, it will be the manufacturers that decide which system is most attractive for commercial purposes.

Since 2002, Sandia has enjoyed an umbrella CRADA with Boeing that has resulted in more than 20 technical projects between the two organizations.



LUX AETERNA — Luxim and Lumenworks manufacture and design the plasma lighting sources and reflectors used in the fuel cell-powered mobile lighting system spearheaded by Sandia. Here, the first outdoor test of the lighting assembly is successfully conducted. (Photo courtesy Stray Light Optical Technologies)

Luxim, Lumenworks, and Stray Light] with Sandia and the end users [Caltrans, San Francisco International Airport, or SFO] in one collaboration, hopefully reducing commercialization barriers that so often hinder the widespread use of new technology," says Lennie. The end goal of the project, he adds, is to get fuel cell technology into more widespread commercial use, particularly in general construction and aviation maintenance applications.

Lennie also points out that the project marks the first time Sandia has worked hand-in-hand with Caltrans, a



THE ALPHA SYSTEM consists of a cart (manufactured by Multiquip), hydrogen tanks, and a fuel cell. The system shown here being calibrated by Altery personnel will be integrated with the plasma lighting to complete the system. (Photo courtesy Altery Systems)



# Logistics and Maintenance groups find success with worker-driven, behavior-based safety program

By Bill Murphy

A number of organizations around the Labs have taken a proactive approach to improving safety in the workplace, adopting a grassroots approach called behavior-based safety (BBS). These efforts supplement ongoing Labs-wide initiatives aimed at improving workplace safety. The Logistics and Maintenance organizations (10260 and 4840, respectively) have realized both injury reductions and cost-savings to the Labs since implementing BBS four years ago. Recently, the organizations had a BBS celebration picnic to recognize those significant achievements, which were only possible with the buy-in of the entire workforce in both groups. The *Lab News* asked John Cerutti, manager of Utility Maintenance Services Dept. 4842 and a member of the steering committee that has overseen implementation of BBS in Logistics and Maintenance, to talk about the program and its successes. Here's that interview, conducted via email:

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**LabNews:** What, in a nutshell, is BBS?

**John Cerutti:** Behavior-based safety (BBS) is a systematic method of identifying the behaviors most critical to accident reduction and reinforcing and refocusing workers on these behaviors through workplace coaching. Since 1984, the BBS concept/methodology has proven to be an effective tool for the reduction of workplace accidents nationwide.

**Q:** Why is it important?

**A:** The BBS process has become the primary tool used in our injury-reduction program in the Logistics (10260) and Maintenance (4840) organizations. Since we started implementing BBS in mid-2005, we have realized a significant reduction in work-related injuries, including a reduction in Total Recordable Case Rate and Days Away Case Rate. One example of the cost/dollar savings from a "cost due to injuries" perspective to Sandia is from \$895,000 in 2005, down to \$224,500 in 2007. The two groups that make up this particular subgroup called the "Operations BBS Team" is only one of many such teams/groups across Sandia, but not all organizations have functioning BBS programs in place at this time.

**Q:** What distinguishes BBS from other approaches to safety?

**A:** Previous programs and approaches to help reduce recordable injuries have been top-down-driven programs that met with only mixed success. We've found that the BBS process, which is a worker-driven program, is quite effective. It oper-



SAFETY TALK — Mike Quinlan, a senior manager in Facilities Management and Operations Center 4800, Maintenance/Logistics behavior-based safety steering committee member Leland Grubb, and Dept. 4844 Manager Jim Rush talk safety during a recent picnic celebrating BBS successes in reducing accident rates. (Photo by Randy Montoya)

ates on the "no name/no blame" principle, and the worker observations are performed by coworkers. The primary group that leads the process is a steering committee that has a chair and cochair and functions independently of management. There are two management representatives on the steering committee. They're not there to direct, however; they're there to provide various basic forms of support as needed, such as funds for awards for outstanding observer efforts and so on. The key really is that BBS is truly worker-driven.

**Q:** How long has BBS been applied at Sandia?

**A:** This particular BBS program started up in mid-2005 with mutual support from both management and union leadership.

**Q:** What kind of success has it enjoyed and how is that measured?

**A:** An example of the success of this program was mentioned in my response above. The primary measures are the number of observations performed each month (with a target of one observation per employee per month), and is compared to the number of recordable injuries per month. Other measures include dollar savings and numbers and types of observable behaviors (both safe and possibly unsafe).

**Q:** What's the future for BBS at Sandia?

**A:** As far as this Operations program is concerned, we are fully committed to carrying it forward. I'm confident, given our proven successes, that we can expect continued support from both management and members of the workforce.

To determine how we might take our efforts to the next level, a three-member subteam of the steering committee visited and reviewed the Y-12 BBS program last May. We learned that their program had started approximately two years before our program, and it was an all-inclusive program. Every single member of their workforce of approximately 4,500 employees from the president on down — including engineers, scientists, represented employees, and so on — participates in their program. They have also implemented human performance improvement (HPI) at their site, since HPI is the next logical step in the evolution toward meeting the Target Zero goal. Sandia has started to implement HPI training here at Sandia, but we are not as far along as Y-12 yet. We still have a way to go, but our success with BBS is proving that with real employee engagement, we can make a real difference in workplace safety.



MAINTENANCE/LOGISTICS BBS steering committee members (from left): Pete Nieto (4843), Daniel T. Sanchez (10263, chair), Carolyn Lucero (10263), Manuel Barraras (4842), Chuck Carroll (10265, cochair), Leland Grubb (10263), David Baca (4848), Tim Saenz (4842), John Cerutti (4842), and Ed Archibeque (10268). (Photo by Randy Montoya)

## ISO 14001

(Continued from page 1)

auditors who assessed Sandia observed that it is rare that a site as large and as complex as Sandia achieves ISO 14001 certification.

The auditors noted that Sandia/New Mexico was the most diverse and complex organization they have certified.

ISO 14001 benefits Sandia because it simplifies and clarifies the approach to compliance and environmental stewardship and it strengthens the Labs' assurance system. Additionally, the certification provides a competitive edge for obtaining Work For Others business. Sandia's EMS Coordination Team presented the ISO 14001 certificate to Tom Hunter on Aug. 10.

Every Sandian and other members of the workforce can help ensure that the Labs maintains its certification in good standing. Auditors will revisit Sandia Nov. 10-13 for a surveillance audit and during that visit may ask questions of anyone about the Labs' environmental practices. Here's how you can be prepared if you or your work area are assessed by auditors for confor-

mance to ISO 14001 standards:

- You should know that Sandia has an ES&H policy: The Environment, Safety, and Health (ES&H) policy of Sandia is to protect and preserve the environment, and to ensure the safety and health of its members of the workforce, by providing a place of employment that is, to the extent possible, free from recognized hazards that have the potential to cause physical harm to workers. Sandia protects worker health, public health, and the environment through continual improvement, the elimination of hazards, and the prevention of pollution.
- You should know how your job impacts the environment as well as how you can mitigate risks to the environment caused by your job.
- You should know if your work instructions (procedures) include environmental considerations. Are your procedures current?

If you give thought to these issues now, you'll be better prepared to answer auditors in November — and

will have a better understanding of how you and your own work related to Sandia's larger ES&H policies.



RECYCLING SANDIA — Sandia's low-density polyethylene (LDPE) recycling effort is one of many ways in which the Labs' Environmental Management System demonstrated its readiness for ISO 14001 certification. In addition to LDPE, Sandia recycles white and colored paper, cardstock, building and construction materials, glass, lab supplies, and equipment — almost everything that can be recycled, is.



# Meteor event

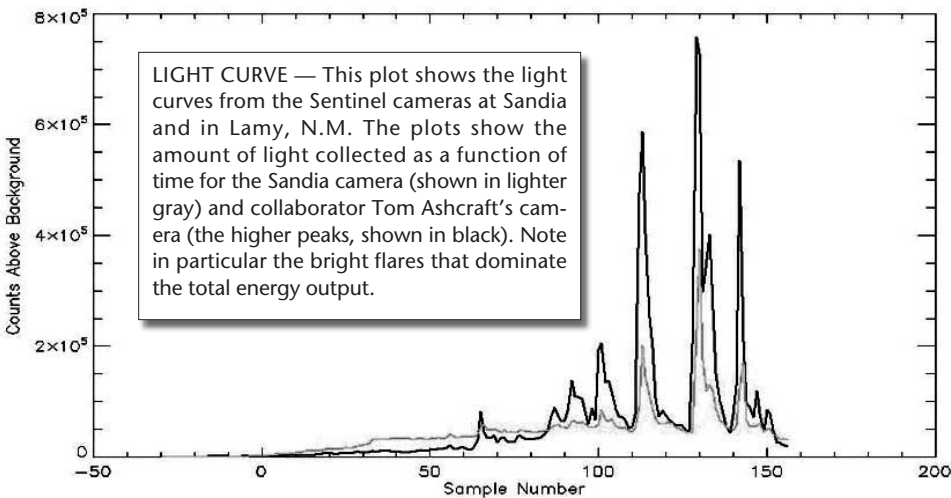
(Continued from page 1)

the Sentinel network to find out if any other systems detected the meteor that night. As with GPS data, the more different frames of reference they have to work with, the more accurately Dick and Dale can refine the trajectory and impact point.

Despite a media-published estimate that the Oct. 9 meteor might be as large as a small car, Dick and Dale think it's likely it was about the size of a beach ball — big enough to make a pretty impressive streak across the sky, but not that unusual. Dick, who's been watching the skies for a long time as part his work at Sandia, says that about once a year there's a meteor event in the Albuquerque skies on the scale of the one seen on Oct. 9.

## Space junk or meteor?

Was it maybe not a meteor at all, but space junk? Dale and Dick can rule that out with confidence. For one thing, the object was traveling too fast: Space junk — most of which is coming out of low Earth orbit — enters the atmosphere at roughly 17,000 miles per hour. A meteor enters the atmosphere at speeds of 25,000 mph or higher.



Also, as the Oct. 9 object swept across the sky in its downward arc, it displayed a flaring phenomenon characteristic of meteors and not seen in space junk reentries.

The flaring happened in rapid pulses; it's quite evident in video of the event and shows up as strikingly obvious spikes in a light curve plot (see chart above) of the meteor's transit of the sky.

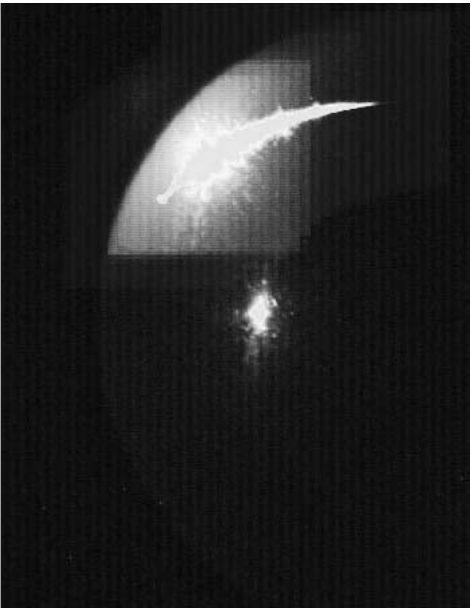
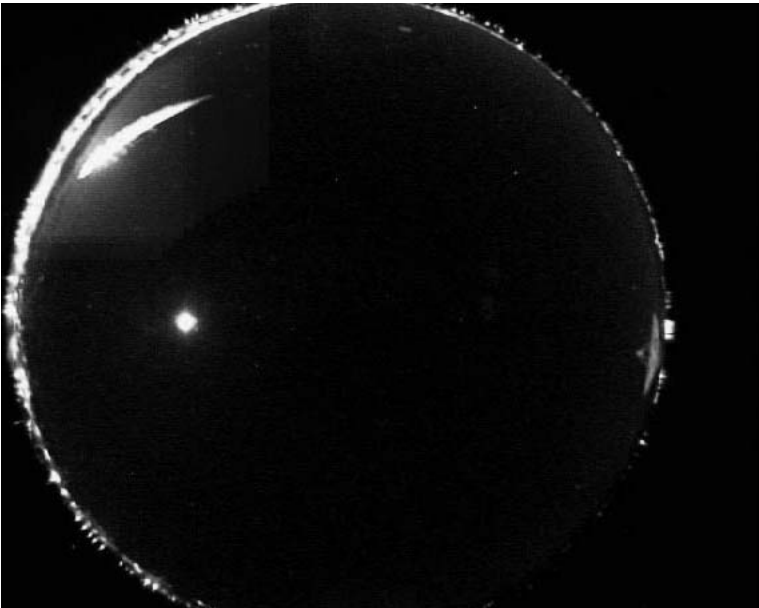
The flares interest Dale and Dick because the mechanism that causes the phenomenon is not well understood. Conventional theory would hold that the flares are caused by a thermodynamic process — the heating and ablation of meteor material. (That's how heat shields worked on the Mercury/ Gemini/Apollo spacecraft.) But the flares recorded on Oct. 9 happened way too fast to be the result of a heating process, says Dick. "There's some other emission mechanism at work

## What is the Sentinel network?

The Sentinel network was conceived of about a decade ago by Sandia senior engineer Dick Spalding (5730) and colleague George Alder (ret.). It was established specifically to record transient light events such as the Oct. 9 meteor. It's designed to monitor the skies more or less automatically, with little need for hands-on maintenance.

Today, there are nearly 100 Sentinel systems deployed in 11 US states and five Canadian provinces; there's even an outlier system in Ireland. They are mostly maintained by knowledgeable and dedicated amateur volunteers. (Astronomy is one area of science where amateurs still make valued, important, and frequent contributions to the body of knowledge.)

A Sentinel system consists of a small, inexpensive black-and-white video camera equipped with a fisheye lens, with digitized video fed to a PC. The camera sees the entire sky and any time a light event occurs that meets certain software-defined characteristics, the camera starts recording whatever is in the video. Thus, whenever a bright light event happens — like the Oct. 9 meteor event over Albuquerque — the Sentinel system captures a precise video record of it.



STREAKS OF LIGHT — Above are composite images of the video taken by Sentinel network cameras at Sandia (left) and in Lamy, N.M., by Tom Ashcraft. In both images, the slash of light at the top left side of the frame is the trail left by the meteor during its eight-second descent. The image was clearly brighter in the Lamy video composite. The other bright spot in each frame is the moon, which was visible in the early morning hours of Oct. 9. The bright lights around the edge of the image at left are the lights of Albuquerque.

here," he asserts.

Dick subscribes to an idea proposed in a paper published last year by

Czech researchers: The flaring detected in meteors is contended to be an electrical phenomenon. According to their theory, as a meteor enters the outer edges of the atmosphere it encounters triboelectric charging, which builds up and discharges over and over again very rapidly. The discharges can be substantial — those are the flares you see in the recordings, Dick says.

Dale, the astrophysicist, agrees that conventional explanations for the flaring phenomenon don't cut it.

"I challenge anyone to reproduce the curve we see

here [see chart at left], demonstrating these effects, using the standard [thermodynamic] model," Dale says.

Understanding the flare-causing mechanism is of more than academic interest. First, Dale notes, a better understanding is needed to ensure safe spacecraft reentry. While the flaring phenomenon and its electrical implications hasn't specifically been associated with spacecraft, it would be the unwise scientist or engineer who would dismiss the concern out of hand.

Also, adds Dick, it's important that the nation's skywatchers understand what they see when they see it. When you see a pattern of unusual flaring behavior in the sky — whether you're seeing it from a space-based or ground-based platform — it's critical to understand what's causing it. Is it that triboelectric phenomenon associated with meteor activity? Or is it a rogue test of a nuclear device?

Understanding the difference is vitally important, Dick says.

The real issue, says Dale, is that there isn't a lot of data available about atmospheric phenomena similar to this.

"There just aren't a lot of resources invested in monitoring the atmosphere," he says.

## Sandia, SRC win Licensing Executives Society award for NINE program outreach

By Neal Singer

Sandia's National Institute for Nano-Engineering (NINE) program, operated in conjunction with the Semiconductor Research Corp., has won a "Deal of Distinction" award from the Licensing Executives Society (US and Canada) Inc. The award — a glass sculpture — was presented Oct. 21 in San Francisco.

LES, founded in 1965, is a professional society comprising more than 6,000 members engaged in the transfer, use, development, manufacture, and marketing of intellectual property.

The award is in the "High Technology" sector, one of five categories established by the society. Sandia won a previous award in the same category in 2006 for innovations in technology transfer.

"The NINE agreements are a completely new model for a public-private partnership so that industry, national labs, and universities can work together in a relatively seamless way," says Sandia licensing executive Paul Smith. Paul, a member of the society, nominated Sandia for the award.

Sandia began the innovative educational approach called NINE to facilitate student education and improve US competitiveness. But it needed a partner to facilitate the flow of funding, information, and intellectual property rights among industry, universities, and the national labs. Sandia found one in Semiconductor Research Corp. (SRC), set up nearly 30 years ago to help the then-foundering US semiconductor industry. SRC is experienced in managing industry- and government-sponsored university research

A novel aspect of the partnership that helped

*"The NINE agreements are a completely new model for a public-private partnership so that industry, national labs, and universities can work together in a relatively seamless way."*

— Sandia licensing executive  
Paul Smith (1031)

win the LES award was the establishment of a non-profit entity called NINECO, structured to allow broad industrial and university participation. NINECO is a subsidiary of SRC and will work collaboratively with Sandia under a Sandia cooperative research and development agreement.

According to an LES news release, "Intellectual property (IP) such as patents, copyrights, trademarks and trade secrets are the fundamental drivers of innovation in our knowledge-based economy. Each year, major IP deals that transfer the rights to IP between companies help drive innovation and ensure that new products continue to reach businesses and consumers."

Sandia leaders in the NINE project include Duane Dimos, Justine Johannes, Regan Stinnett, Kerry Kampschmidt, Paul Smith, Lada Osokina, Jack Jackson, Rene Gonzales Sells, Chris Monroe, and Steve Walsh (consultant to Sandia from the University of New Mexico).



# A walk to remember

*A trip through the halls of the Joint BioEnergy Institute captures spirit of discovery and innovation*



The Joint BioEnergy Institute in Emeryville, Calif., occupies the fourth floor of the EmeryStation East Building. JBEI occupies 65,000 square feet of space in the 245,000-square-foot building.

**Story by Mike Janes • Photos by Dino Vournas**

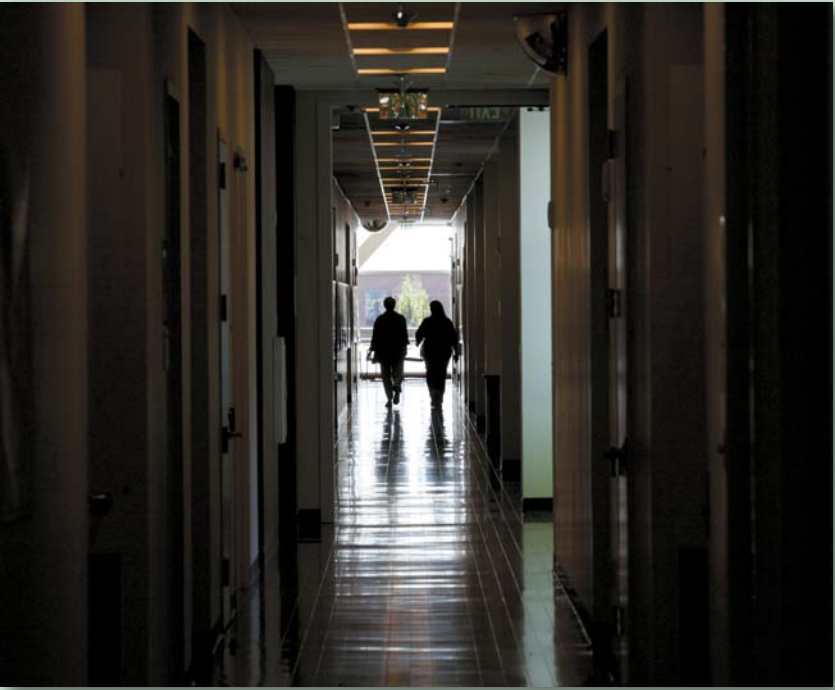
For roughly two years, DOE’s Joint BioEnergy Institute — JBEI — has been in operation in the San Francisco Bay Area Emeryville location. JBEI is a scientific partnership led by Lawrence Berkeley National Laboratory and includes Sandia; the University of California, Berkeley; University of California, Davis; Lawrence Livermore National Laboratory; and the Department of Plant Biology at the Carnegie Institution for Science. JBEI (pronounced jay-bay) is one of three DOE Bioenergy Research Centers and has a clear-cut mission: to advance the development of the next generation of biofuels — the liquid fuels derived from the solar energy stored in plant biomass and from nonfood feed-

stocks. There are now 32 Sandians working at JBEI. Sandia’s Blake Simmons (8625) is vice president of JBEI’s “deconstruction” division, which largely focuses on the development of new and improved ways to pretreat lignocellulose to enhance its deconstruction into fermentable sugars. Among other areas of interest, Sandia researchers at JBEI are looking at new enzymes capable of efficiently deconstructing both the polysaccharide and lignin components of plant cell walls (*Lab News*, June 12, 2007). Sandia researchers are also developing novel microfluidic devices and tailored high-throughput assays to enable discoveries in understanding enzyme-substrate interactions and structure-function relationships. Most recently, Sandia

researchers published their first JBEI paper on the deconstruction of switchgrass (*Lab News*, Aug. 14, 2009). Several other JBEI papers on biomass pretreatment are in development and in press, Blake says, that address advances in enzymes, microbial communities, woody biomass, corn stover, and other agricultural residue. The next year, he says, “is sure to be a challenging and productive period of scientific discovery by researchers at JBEI.” The photos in this pictorial were taken by Sandia photographer Dino Vournas and are intended to convey the excitement and innovative spirit housed within the state-of-the-art JBEI facility.



The Joint BioEnergy Institute as part of its DOE review displayed charts and posters highlighting the lab’s work.



Researchers walk down a long hallway at JBEI.





Dominique Loque, director of Cell Wall Engineering, crawls under a rack to check plant experiments in JBEI's plant growth room.



JBEI includes facilities for growing plants on site that are used in biofuels research.



Pradjakta Pradhan checks projects in the plant growth room.



A researcher takes a sample out of a refrigerated cabinet.



Sandia's Dean Dibble (8625) works with plant deconstruction and pre-treatment in his JBEI lab.



Research scientist Chris Petzold and postdoc researcher Alyssa Redding check the spray tip on the mass spectrometer.



Sandia's Seema Singh (8625) is the director of Material Science-Biomass Pretreatment Dynamic Studies at JBEI. Here she performs high-throughput biomass screening of a plant using near infrared.

**DOE Secretary Steven Chu instrumental in creation of JBEI**

Before he was tapped by President Barack Obama to serve as Secretary of Energy, Steven Chu was director of Lawrence Berkeley National Laboratory. In that capacity he was perhaps the nation's highest profile advocate and champion for research into biofuel technologies.

At its formal December 2008 dedication, JBEI CEO Jay Keasling had high praise for Chu's support of the new research center.

"Long before renewable energy and global warming moved to the forefront of the national consciousness," Keasling said, "Steve Chu envisioned the Helios Program at Berkeley Lab to develop new sources of transportation fuels from sunlight. Steve's steadfast support of JBEI from concept to implementation has helped to make JBEI what it is today."

Just a week after the JBEI dedication, Chu was tapped to become Secretary of Energy.



Sandians Brad Holmes (8625), director of Pretreatment Processing Development, and research associate Kim Tran (8651) carefully pour ethyl alcohol as they purify ionic liquids in a hooded work area.



Graduate student Charlie Liu checks on gels he is monitoring for an experiment. The lab has sweeping views of Emeryville and the Oakland-Berkeley hills.



Guest research associate David Shis isolates genetic knockouts at JBEI.



This information, compiled from Centers for Disease Control sources, describes how the flu virus (including H1N1) spreads and how to determine, based on your symptoms, whether you have the flu or a cold. As we go deeper into the flu season, New Mexico has seen an uptick in cases of both “conventional” flu strains and H1N1. In a subsequent issue of the *Lab News*, more information about Sandia-specific contingency plans related to H1N1 will be published. In the meantime, this guide should help Sandians and their families gain a better understanding of the illness, its symptoms, and appropriate responses. For more information about H1N1 from the CDC, visit the website at [www.cdc.gov/h1n1flu/](http://www.cdc.gov/h1n1flu/).

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### WHAT DO YOU HAVE?

Symptoms to consider when making your own preliminary diagnosis:

#### Influenza

Antiviral medications can help people feel better if taken within 48 hours of onset of symptoms

Headache

High fever

Dry cough

Chest pains

Chills

Severe fatigue

Severe aches

NOTE: H1N1 virus also causes some gastrointestinal distress

#### Cold

Colds are caused by a different virus; symptoms are less severe — and they come on more gradually than flu

Sneezing

Stuffy nose

Hacking cough

Mild sore throat

Mild fatigue

#### Strep throat

A sore throat, but no stuffy nose, may mean it's a streptococcal bacterial infection — antibiotics can help

High fever

Pus on tonsils

Very sore throat

#### Stomach flu

Virus enters via mouth and multiplies in small intestine; symptoms can appear in a few hours, but usually take a day; food poisoning typically is a bacterial infection, such as E. coli

Headache

Vomiting

Fatigue

Diarrhea

## FOLLOWING AN INFECTION

# FLU TRAVELS

Flu viruses constantly mutate, making it tough for our immune defenses to recognize the virus and combat it. Since the current strain of the H1N1 virus (known as swine flu) is relatively new, it may be more contagious than seasonal flu, although it seems no more virulent and most cases should be resolved without significant medical intervention. Here is a look at how flu infections spread:

1

John goes to work feeling fine; while he is out to lunch, Jill sneezes into her hands and then uses John's phone and keyboard; working during the afternoon, John picks up virus on his hands; while leaving, he rubs his eyes and transfers virus into his system

Studies of office equipment found that 66% of viruses survived for an hour; 33% survived for 18 hours

2

Karen takes her son Billy to the playground; he plays with his friends — some sneeze and cough over the equipment; fortunately, Karen uses alcohol wipes on Billy before he can rub his nose or eyes; they return home free of virus

3

John enjoys an evening with family; unfortunately, he does not realize that he is spreading virus around the house; it can take a day or so after you become infected before you show signs of illness

John and Billy share bowl of popcorn; now Billy has virus

John kisses Karen goodbye and gives her the virus

Billy carries virus to school

John carries virus back to office

4

Flu symptoms usually come on quickly; in less than 24 hours, John and Billy have high fevers, severe aches and fatigue; the next three days are spent in bed, miserable; Karen gives them acetaminophen, nonprescription flu medications and plenty of fluids

Driving to work, John starts feeling symptoms — mild headache, low fever — and returns home

After three days, Billy's symptoms don't lessen and Karen wonders if she should seek medical help

DAY 1 DAY 2 DAY 3 DAY 4

5

The disease is at its most contagious levels and Karen tries to protect herself from breathing in the virus; on the morning of the fourth day John's fever is gone and he figures he can go back to work; unfortunately, he is still shedding thousands of flu viruses when he exhales

6

John and Billy need to be symptom-free for 24 hours before returning to work or school; some older, younger or weaker people can still be contagious for a couple of weeks because their immune system has a harder time eliminating the virus from their bodies

### WAYS TO AVOID FLU

Health officials recommend most people get a flu shot — including for the H1N1 virus

#### Vaccination

- Vaccination provides up to 90% protection
- Swine flu shots should be ready by October
- It takes about two weeks before protection begins
- H1N1 vaccination will be in two doses, a couple weeks apart; healthy adults may only need one H1N1 vaccination
- Seasonal flu vaccination is one shot, but for children under 9 they may need two seasonal flu shots, bringing the total to four

#### Wash hands

Wash hands five times a day for at least 20 seconds; this is what it takes to prevent the spread of germs and viruses; less than half the people wash this long and this often

#### Wear mask

Masks can be worn by sick people so any droplets they expel do not easily land on objects or people; most masks are not as effective if worn by people who are well trying to avoid breathing in a virus

Source: U.S. Centers for Disease Control and Prevention, Central Laboratory of Virology, FluFacts.com  
Graphic: Scott Brown, Orange County Register



# Sandian Carlos Gutierrez and retiree Thomas Paez honored with HENAAC awards

By Iris Aboytes

In ceremonies held Oct. 9 in Long Beach, Calif., Sandian Carlos Gutierrez (1114) and retiree Thomas Paez were honored by the Hispanic Engineer National Achievement Awards Corp. (HENAAC).

Carlos was recognized for professional achievement. Thomas, who retired in July, received his award for outstanding technical achievement.

Carlos manages Surface and Interface Sciences Dept. 1114. The department is an international leader in a broad, coordinated array of high-impact, synergistic, experimental and theoretical research focused on understanding and harnessing fundamental surface and interface science mechanisms.

The department has experimental expertise and resources for chemistry synthesis, ultra-high vacuum deposition, nanolithography, and a wide array of complementary advanced materials characterization techniques. The department also has a strong interest in fundamental nanoscience research relevant for nanotechnology innovation. It is engaged in collaborative activities associated with the DOE's Center for Integrated Nanotechnologies (CINT).

Before coming to Sandia, Carlos was a physics professor at Texas State University. He is using his past research experience to help provide a broader perspective



CARLOS GUTIERREZ

to facilitate more coherent research activity in his department.

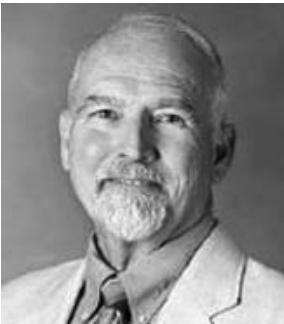
Carlos says that instead of mentoring undergraduates and master's degree students, now he mentors research staff and postdoctoral fellows. He has approximately 10 postdocs in his department.

Thomas came to Sandia in 1984 from the University of New Mexico, where he taught graduate-level classes in random vibrations, structural dynamics, and random signal processing.

When he came to work at Sandia, he performed research in experimental shock and random vibrations. He developed a representation of shock as a nonstationary random process. He also developed techniques for generating experimental realizations of shocks in the laboratory. Later, Thomas worked in structural dynamics analysis, where he spent time developing tools of probability and statistics for efficient modeling of nonstationary random processes and for accurate modeling of stochastic structures.

Thomas most recently worked in the Validation and Uncertainty Quantification Processes Department, where he worked on the development of probabilistic/statistical validation techniques to characterize physical systems as they really are, that is, random and to encourage and participate in the development of stochastic models of structural systems.

Thomas developed the math portion of Sandia's MANOS Science and Engineering education outreach program. The program introduces math, science, and engineering concepts to Hispanic middle schools students. He used M&Ms to teach children about statistics, teaching them how to estimate the mean of random



THOMAS PAEZ

quantity and how to create a histogram describing the distribution of values a random quantity can take.

Carlos was presented his award by VP Les Shephard. Thomas received his award from VP John Slipke.

## ECP FACTS 09

**Sandia's Employee Caring Program campaign ends Oct. 23**

**Make a difference today by going to [give.sandia.gov](http://give.sandia.gov)**

**Corporate Cornerstone established in 1998**

**Corporate Cornerstone** members are companies that choose to direct their corporate gifts to pay the United Way of Central New Mexico's administrative expenses. About 70 companies are included in this group. This ensures that your gift goes directly to the people who need it the most and not to pay administrative costs.

**Money-back guarantee:** Contributions to the United Way Community Fund are backed by a money-back guarantee. If you are not satisfied, you can request a refund by calling 505-247-3671.

**Programs funded by the Community Fund focus areas:**

- Helping children and families succeed
- Improving health and wellness
- Increasing self-sufficiency
- Empowering victims of violence

**Designate an agency of your choice.** You take total charge of your contribution.

# Like fine china, Evan Donnelly breaks easily

By Iris Aboytes

Evan Donnelly says spaghetti is one of his favorite meals.

"Without the meat," he says. "I am kind of a vegetarian." Evan is the 7-year-old son of Janine Donnelly (10665). He has osteogenesis imperfecta (OI), Type IV, commonly known as brittle bone disease. The fragility of bone in OI is due to genetic collagen problems. It has nothing to do with the calcium part of the bone and has no cure or treatment.

When Evan was a year old and learning how to walk, he fell and broke his elbow. "We were very fortunate," says Janine. "His disease was diagnosed right away by Children's National Medical Center in Washington, D.C., where we lived. Evan had a skin biopsy and a blood test that were sent to the University of Washington in Seattle, the only lab in the country that performs this testing."

Janine and her husband Mike were OK with the diagnosis. They could handle a fracture a year. Unfortunately, that did not last long. Evan has had close to 30 breaks. In the last three years, he has broken his legs 18 times and had rods put in each leg. Evan now wears lower leg braces to help keep his legs from breaking.

Evan is currently wearing a cast on his right elbow. It was dislocated and broken in three places. A permanent rod was inserted to help keep the elbow together. He went almost three months without a break.

"Evan is currently participating in a bisphosphonate therapy medical study at the National Institutes of Health [NIH] that not only benefits him, but will hopefully help other children in the future," says Janine.

Every three months Evan and Janine travel to Bethesda, Md., where Evan receives a pamidronate intravenous infusion for three days, four hours a day. Pamidronate is a bone-resorption inhibitor. He also receives growth hormone shots, and goes to daily physical therapy as part of his treatment. While at the



7-YEAR-OLD EVAN DONNELLY, son of Janine Donnelly (10665) charmed and touched an audience of Sandians during a Center 6700 all-hands meeting at the Steve Schiff Auditorium. Evan, who has brittle bone disease, talked about his illness and his life. (Photos by Randy Montoya)

NIH, Evan sees a multitude of doctors and has a lot of testing done.

"We stay on site at the Children's Inn, which is a part of the NIH," says Janine. "He gets the best care possible. The NIH pays for everything, including our flight to Maryland.

"The OI Foundation, which is part of the United Way, has been a huge resource. They provide information for doctors and teachers, books for families, and sponsor support groups in local areas," says Janine.

Evan was recently selected by the Children's Miracle Network to represent New Mexico as the Champion Child for 2010. He will be a spokesperson for the University of New Mexico Children's Hospital, which is part of the Children's Miracle Network. As part of this honor, Evan will travel to Washington, D.C., where he and the rest of the Champion Children from across the United States will meet the president at the White House.

"I don't think I am going to wear a tie," says Evan. "I could choke. I am not big on ties. I know that I am special because I get to meet the president. I think we will become friends. We have things to talk about."

A second-grader, Evan says he likes computers and physical education. "In PE, I exercise to stay nice and strong," he says. "Exercises keep me healthy and that way I won't get sick." He and his best friend Luke like *Star Wars*.

"Evan is a happy little boy with a wonderful disposition," says Janine. "With all the fractures and emergency room visits, Evan handles it all. He is always calm and collected. Rarely does he cry — usually just about the IV if he needs one. He's pleasant with the doctors, nurses, and X-ray techs; he's usually quite chatty and funny. As we have to spend so much time at the ER, he knows what has to be done. He also knows it's important to be well-behaved and positive. He really helps to make a difficult situation better for everyone involved. He amazes me."

Evan was at Center 6700's recent all-hands meeting. In a matter-of-fact way he said, "I am just going to tell people about my life."

If you open your door on Halloween and it is Commander Rex from *Star Wars*, it could be Evan Donnelly. Be careful, he just might win your heart.



# Mileposts

New Mexico photos by Michelle Fleming  
California photos by Randy Wong



David Waymire  
35 5935



Christine Gutierrez  
30 10685



Faye Long  
30 10242



Sandra Klassen  
25 2957



Randy Mayes  
25 1522



Tia Reid  
25 10507



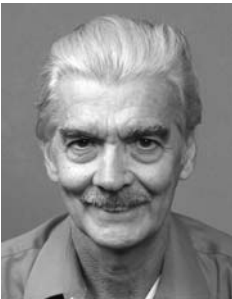
Dan Williams  
25 4827



Jeffrey Duncan  
20 5632



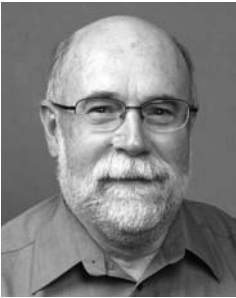
Karen Higgins  
28 8425



Bob Floran  
16 5926



David Olson  
15 6754



George Trever  
20 5577



Dana Crosby  
15 9532



Karen Devine  
15 1416



Cheryl Herrera  
15 10664



Susan Leach  
15 10618



Mark Reece  
15 1813



Lupita Serna  
15 6441



Bryant Sterling  
15 2956

## Recent Retirees



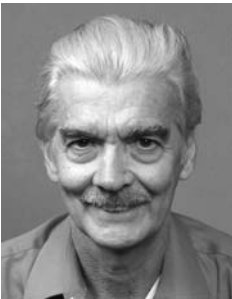
Jean Sena  
34 1522



Martin Imbert  
33 2667



Karen Higgins  
28 8425



Bob Floran  
16 5926



David Olson  
15 6754



Jay Hammond  
20 2952



Richard Hunt  
20 5336



Duane Landa  
20 5231

**ETHICS IN ACTION:**  
REAL CASES AND OUTCOMES

ETHICS CASE #2

Ethics and Business Conduct Office is proud to introduce **Ethics in Action: Based on Real Cases and Outcomes.** Many Sandia National Laboratories employees want to know when Ethics or Corporate Investigations takes action on reports of unethical business conduct. Ethics in Action will highlight Sandia National Laboratories Ethics and Corporate Investigations cases, and outline the responsive action taken by the Corporation.

**CASE ISSUE: THEFT OF GOVERNMENT PROPERTY, MISUSE OF JIT SYSTEM**

**Background:**  
A member of management contacted Corporate Investigations because of concerns that an employee was mischarging JIT purchases.

**Issue:**  
An employee, in an authorized position to purchase property and equipment on behalf of Sandia, was abusing privileges with the Sandia Just in Time (JIT) program.

**Facts:**  
An investigation found that:

- The employee received, concealed and retained government property.
- The employee presented false claims upon and against DOE by submitting these false claims through JIT vendors for payment by Sandia for property to be used for the employee's personal benefit.

**Resolution:**  
Following Corporate Investigations' internal investigation, DOE IG was notified and further investigated the matter. The employee was prosecuted in federal court for stealing federal government property. The employee received one year in prison and two years' probation and was ordered by the court to make restitution to Sandia in the amount of \$113,000.

Issue: Theft of government property, misuse of JIT system

**Applicable Policy:**  
The employee was in violation of Setting the Standard - Code of Ethics and Business Conduct, SCM100.2.6 Fulfill P-Card Responsibilities, SCM100.3.3 Manage Property, and ISS100.3.1 Report Personnel Security Information; Security Incidents; and Waste, Fraud, and Abuse.

Sandia National Laboratories



# Rachel Kolb and her friend Scarlett return to Stanford

Story by Iris Aboytes • Photos by Randy Montoya

Rachel Kolb (3651), our summer intern, is an excellent writer; but if you're a regular reader of the *Lab News*, you probably already know that. Weeks after her departure, her stories continue to appear in the pages of the *Lab News*.

"I have always loved writing for its expressive freedom," says Rachel "Sometimes I feel like I am never more myself than I am on the page."

Rachel, the daughter of Bill (4827) and Irene Kolb (2996), just began her sophomore year at Stanford University and plans to major in English. She says her true passion is in the language arts, but science and technology also interest her. Rachel is a National Merit Scholar and received a Lockheed Martin Corp. Scholarship in 2008.

As a high school student, Rachel was a regular contributor to her school paper, the Albuquerque Academy *Advocate*. And last year at Stanford, she was honored with the prestigious Boothe Prize — twice — for essays written in introductory-level courses. She is the first student in Stanford history to have received this award two times.

Rachel's love of writing is equaled only by her love of horses. She says she can't remember a time when she didn't love them. Her passion began at age two when she rode her preschool teacher's thoroughbred.

"After that, I begged my parents for riding lessons," she says. She got her first horse, an Appendix Quarter Horse named Nifty, at age 12.

"I've had two other horses since Nifty, and they've each taught me something," Rachel says. "Horses are like children — they have their quirks. It takes patience

to work through the issues. But the result is a relationship that's beyond words. Everything, from riding to barn chores, gives me joy."

Today Rachel rides a gray Holsteiner mare named Scarlett. Like her namesake in the classic American novel *Gone with the Wind*, Rachel says Scarlett often has an attitude.

Scarlett stands prouder and mightier as Rachel readies her for a stroll. "I absolutely love this horse," says Rachel, as she mounts Scarlett and takes the reins. "Horses, like writing, allow me to be myself." Scarlett takes Rachel's cue and prances with elegance and finesse, knowing she and her friend Rachel are going for a ride.

When Rachel returned to Stanford this fall, Scarlett went with her. "I think she likes being a California girl, like I do," says Rachel. She and Scarlett are part of Stanford's equestrian team, which competes in intercollegiate horse shows in the disciplines of English, hunt seat equitation, and Western. Rachel, an English rider, will be one of the team's horse managers this year.

"This has been a great summer," says Rachel of her time at Sandia. "I've been able to interact with different people. I've enjoyed honing my skills while seeing the kind of work that is done at Sandia."

Rachel is deaf.

"We all fully accepted Rachel's deafness pretty quickly as just of part of who she is," says *Lab News* editor Bill Murphy (3651). "I really didn't know what to expect from her, how much of a contributor she wanted to be. Well, she answered that question pretty quickly. She was here to make a difference. She'd finish up one



Rachel leads a reluctant Scarlett and Chance back to the barn.

story before I could think of something else to assign her.

"Rachel kept me on my toes, that's for sure. And as the quality of her writing became apparent, I started feeling like Tiger Woods' swing coach — there just wasn't a whole lot I was going to teach her. The fact is, she probably taught us — all of us — a lot more than we taught her."



Scarlett takes her friend Rachel for a ride.



Rachel reassures Chance, her sister Leigh's horse.

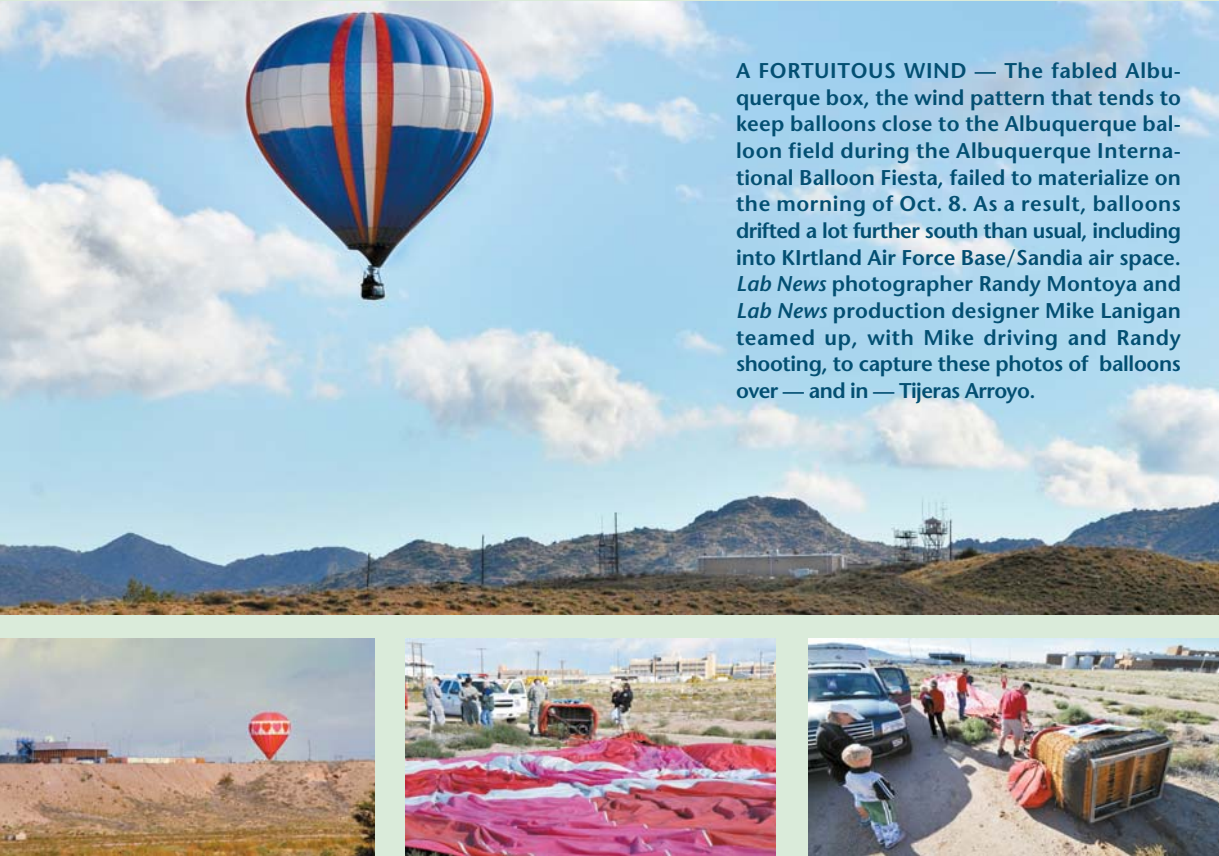
October is Disabilities Awareness Month

Coming in 2010

Upgrading HR information solutions and business processes

<http://upgrade.sandia.gov>

## Up, up, and away . . . in my beautiful balloon



A FORTUITOUS WIND — The fabled Albuquerque box, the wind pattern that tends to keep balloons close to the Albuquerque balloon field during the Albuquerque International Balloon Fiesta, failed to materialize on the morning of Oct. 8. As a result, balloons drifted a lot further south than usual, including into Kirtland Air Force Base/Sandia air space. *Lab News* photographer Randy Montoya and *Lab News* production designer Mike Lanigan teamed up, with Mike driving and Randy shooting, to capture these photos of balloons over — and in — Tijeras Arroyo.